



## Seminarium Zakładu Energetyki Jądrowej i Analiz Środowiska (UZ3) Departament Badań Układów Złożonych (DUZ)

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### Scale problem of the liquid metal reactors

#### Abstract:

The microdemonstrator is a simplified and low-temperature experimental loop that will be the first step in the development of DFR technology. This device will consist of two loops – a fuel and a cooling loops, which will be coupled by a heat exchanger – as is the case in DFR. Due to the use of low temperature, the liquid metal in both loops will be lead-bismuth eutectic. Additionally, magnetohydrodynamic pumps will be used in the system. The objective of the microdemonstrator is to reproduce the thermohydraulic flow and heat transfer properties of the DFR loops. Later, the microdemonstrator will be succeeded by a mini-demonstrator which operates at a higher temperature of liquid lead.

This presentation will show the flow models and obtained results of the microdemonstrator and minidemonstrator realized in Cathare-2 code. The presentation begins with a discussion of the chosen dimensionless numbers and the process of scaling down the models. Furthermore, it will be shown what properties and dimensionless numbers affect the discussed phenomena for the two demonstrators. The effect of heat exchanger design and liquid metal velocity on the value of forced convection in the heating (fuel) loop will also be presented.

Serdecznie zapraszamy  
Mariusz Dąbrowski, Tomasz Kwiatkowski  
<http://www.phd4gen.pl>

#### Bio:

**Mateusz Nowak** is a PhD Student at National Centre for Nuclear Research. His research is focused on heat transfer control by the pumping system in the Dual Fluid Reactor.